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ABSTRACT

The effectiveness of computers and related information technologies in changing educational environments is largely determined by the presence of three conditions: (1) good advance planning; (2) appropriate and extensive inservice training; and (3) easily accessible high quality courseware/software. Utah is an example of a state that has implemented an Educational Technology Act which provides the means to accomplish these three conditions with unified efforts of public and higher education agencies, as well as business and industrial corporations. As education proceeds into the uncertain future in the information society, educational technology provides an initiative for change. Educators are having to rethink their traditional roles and how new technology will be utilized in the teaching/learning process, and business leaders are finding it necessary to employ educators who have an instructional technology background. Colleges of education must broaden their base and begin immediately to prepare a new type of teacher. Now there are storage and delivery tools, which when combined with well-designed and validated courseware, have the capability for presenting instruction to students that results in more learning, in less time, with greater retention. These tools change the role of the teacher to a facilitator of the learning process rather than a dispenser of information, giving them time for more one-on-one contact with learners. Tools alone are not enough, however. A technology of instruction must be behind the use of tools, imbedding proper instructional design principles into the learning materials delivered by the tools. Technology, both as a systematic process for designing effective learning experiences and as equipment and instructional materials, is at the core of an educational system for the 90s. (A copy of the Utah legislation is appended.) (19 references) (DB)

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EDUCATIONAL TECHNOLOGY:

INITIATIVE FOR CHANGE

by

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Author's Added Note: A shortened version of this paper is to be published in the Educational Media and Technology Yearbook, Volume 17, 1991, p. 5-17, as the lead article of a 364 page book providing reports on the status quo of instructional and educational technology in 16 states. Substantial articles are also devoted to computers in schools and colleges, virtualities (virtual realities), video technology in teacher training, and a summary of the years events in educational media and technology, along with information on related organizations in the United States and Canada, as well as an annotated list of media-related print and nonprint resources. The publication date is set for October, 1991 by Libraries Unlimited, Inc. in cooperation with the Association for Educational Communications and Technology, P.O. Box 3988, Englewood, Colorado, 80155 ($55.00 U.S.; $66.00 outside North America - ISBN 0-87287-933-X ISSN 8755-2094)

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James Madison once stated:

Knowledge will forever govern ignorance: And a people who mean to be their own governors, must arm themselves with the power which knowledge gives. A popular government without popular information, or the means of acquiring it, is but a prologue to a farce or a tragedy; or perhaps both.[1]

As educators have learned, knowledge is, indeed, power. How freely and how equally citizens have access to knowledge determines the power they are able to exercise. As our need for knowledge grows, our dependence on complex sets of institutions and mechanisms to supply it becomes greater. The printed page, the television screen, and the computer terminal all supply needed information. All of these media of information are now major parts of the information society. Ease of access to information has become a pressing need of our time, and electronic access to information and knowledge is likely to become the most pressing need of the decade of the 1990s. It is within this context that educational leaders in some states have begun planning for improving access to information and knowledge through ***Educational Technology Initiatives*** which appear to be promising thrusts toward restructuring schools with optimized instructional design and technology.

The effectiveness of computers and related information technologies in changing educational environments is largely determined by the presence of three conditions: 1) good advance planning, 2) appropriate and extensive in-service training and 3) easily accessible high quality courseware/software.[2] Utah is an example of a state that has implemented an Educational Technology Act which provides the means to accomplish these three conditions with unified efforts of public and higher education agencies, as well as business and industrial corporations. This act provides, with the cooperation of business and industry, some $200 million dollars to flow into public and higher education during the first half decade of the 1990s. It appears to be the first and most extensive legislation passed by any state to upgrade education through technological applications.

Educators generally have been slow to accept technology to improve the learning process. The first U.S. Secretary of Education, Dr. Terrel H. Bell, was recently quoted[3] to highlight the exceptionally slow educational changes related to technology:

> The education system is having a slow and difficult time adopting technological advances which could multiply the efficiency of instruction. Much of the task of storing and retrieving information and presenting it to students will be done by the computer. Progress toward that time is being impeded by those who warn that technology will dehumanize education. It is my view that technology will give teachers more time to meet personal and individual needs of students by taking over the information-giving function. We must somehow, learn to persuade the decision makers to shake up and change our approach to teaching and learning. The potential of technology must be used to

provide the nation a more effective and productive education enterprise. ***American Education is wobbling down electronic avenue in an oxcart!***

It has been 13 years since Dr. Bell made that statement in a 1977 speech in Minneapolis and in his opinion we are still wobbling as we enter the 1990s. Does anyone really believe that technology is dehumanizing? Our personal beliefs are that technology has the potential to make the learning process more humane than ever before in the history of public education! If teachers are freed from reinventing instruction, freed from always being the content person and the dispenser of information, they will have time for more one-on-one contact with learners. If we truly want to make educators more humane, then we must provide teachers with tools and resources that will deliver content more effectively so teachers can deal with learners more personally.

Technology in Corporate and Public Education

As education proceeds into the uncertain future in the information society, changes will continue. Educational Technology provides an initiative for change. New roles for educators emerge in the application of instructional design and technology. Educators are having to rethink their traditional roles and how new technology will be utilized in the teaching/learning process. Even business leaders are finding the absolute necessity for employing educators who have instructional technology backgrounds. In his recent book, Jack Bowsher,[4] former Director of Education for IBM, called Instructional Design Technologists the "Educational Architects of the Future." He suggested that in the future there will be new career paths for educators. He describes, in some detail, instructional design and technology applications at IBM, and suggests that professional educators who have built the existing courses and programs in most organizations probably comprise too small a group to deal with the explosive growth that will occur in the 1990s and beyond. He states that there are real needs to develop outstanding educators who will have long careers both as instructors and course developers ***in industry***. Because education plays a critical role in helping each major area of a business meet strategic and tactical objectives, the education department in corporations is challenged to maintain a high level of staff competency and vitality as the pace of change quickens and the organizations' dynamics become more complex. In 1986, IBM discovered it was spending $900 million a year on employee education without any central management. What happened next was good for IBM and good for education. It was Jack Bowsher, IBM Director of Education for External Programs, whose two-year study revealed these facts. That discovery led to a major restructuring of IBM education and tied training directly to jobs, and streamlined delivery with big doses of ***instructional design and advanced technology***.

Education at IBM is on the move. It has jumped to the top of the company mangement hierarchy, joining other key business functions, such as manufacturing and finance, that report directly to the top-ranking management committee. It is also heading rapidly out of the classroom into the world of advanced technology. Those two changes-- a central role for education at a high corporate level and more technology for delivering it-- are good predictors of what could happen in other large companies interested in getting high quality from their big-ticket training expenses. The yearly education budget of $900 million includes the costs of the people, equipment, and facilities needed to deliver the training but does not include salaries of the people being trained.[5]

Colleges of education, as well as the public schools, have been confronted with tremendous challenges in the past decade including eroding economic factors, declining public support, and quality faculty leaving the teaching profession for higher paying careers. Some individuals are questioning the need for teacher certification and whether or not colleges of education should even exist in the future. We believe colleges of education should exist, but must broaden their base and begin immediately to prepare a ***new type of teacher***. This teacher should be more a facilitator of the learning process than a dispenser of information. Teachers must be provided with, and taught to manage, well-validated interactive learning materials to help slow down the amount of instruction that is reinvented.

Reinventing Instruction: New Tools Needed For Teaching

For nearly two hundred years, teachers in America have been reinventing instruction. Dr. Robert Heinich in his article, "The Proper Study of Instructional Technology" said... "the economy of American education is based on the reinventing of instruction each year". [6] Educators and the taxpayers can no longer afford this false economy. The idea of putting 35 young people in a box, and only giving the teacher a textbook and piece of chalk, and expecting positive results is ludicrous. Dr. William Ridley, former vice-president of Control Data Corporation, said, "We tell teachers to deal with individuals and then we put them into an environment that makes it impossible".[7]

Some instruction simply does not need to be reinvented by hundreds of individual teachers all over America, staying up all hours of the night cutting paper plates and string trying to figure out a way to explain fractions each time it is taught. There are now storage and delivery tools, which when combined with well-designed and validated courseware, have the capability of presenting instruction to students which results in more learning, in less time, with greater retention. We have personally witnessed laser-based videodisc math and science programs,

which combine the best teaching methods, with outstanding content, generated by the best minds in America, that result in student mastery of the material at levels significantly higher than most teachers can achieve using traditional techniques.

These tools change the role of the teacher from dispenser of information to facilitator of the learning process. Our teachers deserve these tools and yet we are slow to provide them. Educational administrators must get used to paying more for quality courseware. They must also invest more of the school's financial resources into well-designed learning materials rather than so much of the budget in salaries. These are tough decisions and are sometimes perceived as extremely threatening to faculty who fear being replaced by technology. There is a saying, " If people think they can be replaced by technology they should". However, good teachers have no fear of being replaced by technology. We do not think anyone really believes that technology can or should replace teachers. Quoting from the National School Board's policy position about technology:

> **Technologies will never replace classroom teachers, but are as essential to this profession's growth as they have been for law, medicine, and accounting. Teachers as managers of information will be more effective and capable of greater student individualization in their approach to classroom learning. Indeed real choice in education can come through the unlimited information and instructional development available for students.**

What is wrong with admitting that new tools are needed by teachers and that they have a legitimate place in American education? It was Henry Ward Beecher back in the 1800s who said, "With tools a man has more power. He has more variety in his skills. And he has infinitely more efficiency to make shorter work of his job". Tools alone are not enough, however. A technology of instruction must be behind the use of tools imbedding proper instructional design principles into the learning materials delivered by the tools. We believe that we are beginning to appreciate the potential of technology but many educators still do not understand or define technology properly. Some educators and business persons equate the term technology with computers and computers only. They have a hardware definition of technology and do not see it as a systematic process for designing instruction.

Technology Defined

John Kenneth Galbraith, the noted American scholar and economist, does not define technology as hardware but said that ***Technology*** means **the systematic application of scientific or other organized knowledge to practical tasks.**[8] This is how much of the world defines technology as it is applied to areas ***other than education***. But what about technology as applied to education? Heinich, Molenda and Russell[9] define a technology of instruction as **"A**

teaching/learning pattern designed to provide reliable, effective instruction to each learner through application of scientific principles of human learning."

General characteristics of technology that should apply to instruction include, replication, reliability and improved cost effectiveness, through increased economy of scale. To these we would add "a more humane education" by increased one-on-one contact between teacher and learner, plus "improved quality of instruction".

The sciences that have contributed to instructional technology include the behavioral, managerial, physical and cognitive sciences. From the behavioral sciences we concern ourselves with learning theory, perception and communication. From managerial sciences come cybernetics, systems theory and task analysis. From the physical sciences have come optics and electronics, and from cognitive science we are learning how individuals mentally process information. Technology does have a place in education and the sooner we as educators begin to apply it to help solve critical problems, the better. There are two recent monographs which discuss in more detail the current needs of U.S. colleges of education, as well as presenting a worldwide view of needed changes in educational content.[10]

The 1970 Presidential Commission on Instructional Technology defined Instructional Technology as:

> **A systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication, and [then employing a combination of both] human and nonhuman resources to bring about more effective instruction.[11]**

The nonhuman resources mentioned in this definition are the well-designed and validated curriculum materials delivered by sophisticated tools. The human resources are teachers who have been prepared to facilitate learning through the creative use of technology.

It has been said that "school" is a "technology" of education, in the same way that cars are a "technology" of transportation. School today includes some 125,000 buildings, nearly three million teachers, 50 statewide systems of education, and some 15,000 local educational jurisdictions. This technology has touched the lives of every living American. The forbearers applied America's best information technologies to the then unprecedented task of offering educational services to the masses of learners through the public schools... somehow the invention did not endure once the system was in place...schools today reflect their 19th-century technological roots more than do most other institutions.[12]

Public school decision makers (board members and administrators) will demand better prepared teachers capable of using technology to manage student progress and facilitate the delivery of instruction. At the same time, they will demand validated learning materials which are delivered by highly sophisticated tools. Students entering colleges of education should have a choice of preparing for a career in the classroom or for employment with companies that design, develop and validate quality learning materials. We need educators working in other sectors of society who understand the learning process and are capable of creating the resources which teachers need to be effective in their work with young people. Colleges of education should be concerned with learning wherever it occurs, in any environment, at any age. If schools of education limit themselves to K-12 and only to preparing individuals for classroom careers, they will be in serious trouble in the future. We need to look at broad solutions to the problems facing education and prepare professionals not only for careers in the schools but also for the corporate world to **design, develop, evaluate and validate** the learning resources and processes needed in the schools.

Third Wave Education

Charles Reigeluth[13] made a comparison between our educational system and our transportation system. Our transportation system consisted primarily of the horse for a very long time. Like the one-room schoolhouse, the horse was very flexible for meeting the needs of the individual; you could go almost anywhere you wanted to. Yet there were problems with the horse. It wasn't very fast or very comfortable, especially in bad weather. Dr. Reigeluth went on to say that some people spent a lot of time trying to reform the prevailing structure by doing such things as breeding faster horses and building better trails and bridges to improve the horse's speed, or making more comfortable saddles and creating carriages for the horse to pull to improve comfort. However the gains to be made were small compared with the development of an alternative structure, the railroad.

The railroad was far faster, more comfortable, more reliable, and more efficient than the horse. It could transport many more people much greater distances far more cost-effectively. Somewhat, like our current educational system, it was much less flexible; you were greatly restricted as to where the tracks took you and when. As society has continued to change, our transportation needs have also changed. We must travel even greater distances in less time, and people need to have much more flexibility as to when and where they will go. Many people have spent a great deal time "fine-tuning" the railroad. But the quantum leap, again, came from an alternative structure, in this case one that entails the

use of a variety of transportation modes, primarily the airplane and the automobile. As the one-room schoolhouse, a "first-wave" educational system was appropriate for what Alvin Toffler[14] calls a "first-wave agrarian society", so our present, second-wave, educational system has a structure and philosophy that was appropriate for a second-wave industrial society. As John Goodlad[15] points out, there are problems with the industrial production model of schooling. One cannot help but note some structural similarities to an assembly line, whereby students move from one specialist teacher to another at the ring of a bell, in the plan to have the same new "component of education" added to each learner. A third-wave educational system is needed to provide a quantum leap for meeting the changing needs of our third-wave information society, and like our current transportation system, it is probable that it will make use of a variety of means of facilitating learning. Charles Reigeluth concluded his analogy by saying that "each structural change that has occurred in our transportation system has become possible only by the advance of technology, and in fact technological advances have made the rise of alternative structures inevitable. But the change is never revolutionary; it is evolutionary. Horses are still used for transportation in some places. Many trains are still in use today. And, there are still some one-room school houses."

It is very easy to develop ***Hardening of the Categories*** and refuse to face up to the realities of a changing society. John Wedman, Professor at the University of Missouri at Columbia, once told of an elderly professor who took his granddaughter to the airport to watch the airplanes take off and land. As a very large plane took off, the elderly professor said, "Isn't that fantastic!" His little granddaughter replied, "What's that grandfather?" And he said, "Isn't it fantastic that those big things can actually fly!" She looked up at him and said, "***But grandfather, that's what they are supposed to do!*** " Young people just assume airplanes fly, and computers compute and are not the least bit impressed or nervous about why. When it comes to thinking about technology and it's place in education, many of us are looking from a perspective not unlike the elderly professor's. As educators, it is important to be open to the ways technology can be applied in the teaching/learning process and not be so quick to find justification for our own insecurities. Especially is this true of the computer, a universal and powerful technological tool for teaching with desktop multi-media presentations to full classes, as well as for individualized instruction. The greatest potential power of computer technology for teaching remains isolated from most teachers because of the limited access to secluded computer laboratories outside the typical classroom. The personal computer is now at least equal in importance to paper and pencil in public schools and colleges of education.

The Pencil and Computer Technology

Bill N. Lacy, President of the Cooper Union, a private all-scholarship college in New York, provided a powerful tongue-in-check analogy between the personal pencil and the personal computer revolution. He wrote in the mid-1980s of the event of the pencil invention as one of the great educational happenings since the renaissance. Bill's humorous pun on the pencil is amusing to read, but a great lesson for us to review as we look at past technological innovations in education, and the personal computer at present. He said, in part...[16]

> Doubtless the most important development of the age has been the introduction of the "personal" or "home" pencil, which has prompted a series of changes we call "The Pencil Revolution". When pencils appeared, few accurately predicted the great impact they would have. Originally thick and blunt, it was not until the arrival of the user friendly pencils, accompanied by a sharpener, that they were taken advantage of on a widespread basis.
>
> At first, pencils were employed only in commerce--creating price tags was an early application--but soon people discovered other uses. The legal profession was able to quadruple its business when one attorney invented the written contract.
>
> It was not long thereafter that the introduction of pencils in higher education was witnessed, and universities found themselves facing the demand for the new equipment. There was considerable debate about the pencil's importance. "Just because they have a pencil doesn't mean a lot of education is going on," was a common sentiment. Eventually, though, the great schools fell into line. Many date the turning point to the 14th Convention of Deans, Scholars and Scribes in 1248, when Dean Niccolo of Padua removed a pencil from his cloak during a feast and used it to record the address of Claude of Navarre, a friend of the University of Paris dean. The crowd was awestruck, and the moment is remembered not merely for what it did for the pencil, but for bringing a lot of convention business to Padua...
>
> New applications appeared daily; people used pencils for shopping, banking and writing notes for bulletin boards. Ads for pencil camps appeared in the back pages of Sunday-magazine sections. "Pencils is where the future is," said a pert eight-year-old girl in one of the ads. "Math, literature, foreign languages, even art--you can do it all with a pencil."
>
> In the end, the world came to accept the pencil, even to assume that civilized life could not be lived without it. But historians marveled at the amount of time wasted worrying about this labor-saving device instead of pausing to consider which tasks really needed doing and which did not....

Gavriel Salomon[17] more recently suggested that personal computers are more like pencils than other technological developments we have experienced. His principal concern is that computer laboratories [necessitated by the high cost of computers in the past and the lack of teachers trained to use them] are a bad idea but are now sanctified from past practices forged at the introduction of computer technology into education. He uses a parallel "pencil" analogy, stating that:

> ...One day, word came with the migrating birds of a new technology, a "one in many centuries invention": The Pencil. There was so much excitement in the air, and without hesitation, two elders were sent away ... to learn all they could about that marvel. Back they came and before long a special alcove was outfitted for pencil studies. It was carpeted with the biggest papaya leaves, and special cushions, made of camels' hair (the origin of the word "soft-ware") were installed. No kid could enter that alcove without first washing his or her hands!
>
> Fascinated by the new technology, the most future-oriented elder of the tribe was assigned to start planning for and conducting Pencil Literacy Studies in the newly outfitted alcove. Indeed, soon enough, there was a whole new and most exciting curriculum of Pencilology. And how exciting it was!

Salomon recommends that the computer must become a tool of all, just as did the pencil. Computer laboratories, he further proposes, are like his imaginary ***Pencil Alcove***, sequestered for the few and no longer an effective strategy. He implies that like the ***Pencil Alcove***, the computer lab today, with its independent curriculum and instructors, now stands in the way of spreading literacy to where it really belongs: directly in each and every classroom! He further alleges that desired changes cannot take place as long as teachers do not have a sufficient number of computers in their classrooms, for even limited periods of time. The computer, as a centerpiece of Educational Technology in today's society and school, is a "trigger for change" but cannot be a very effective trigger if nothing else is triggered by it.

A recent NEA Special Committee Report, stated, as a major policy position, that ***All schools should develop and implement a plan to install a computer with adequate software on the desk of each teacher by 1991.***[18] It is seldom that such a sweeping pronouncement by the nation's largest educational association takes place. The NEA special report, released July 5, 1989 and other technology related events, are "triggering" a number of state educational and computer technology initiatives, corresponding to Utah's ***Educational Technology Programs*** [Part 7 of Title 53A , State System of Public Education, Utah Code Annotated1990 Cumulative Supplement, provided in full as Appendix A].

Conclusions

The several states that are passing legislation calling for the implementation of technology in the schools must be careful not to fall into the trap of the 1960s, which was a "hardware" based approach. The majority of funds should be spent on courseware, inservice and preservice training of teachers. Obviously funds for hardware will be needed but only after the critical curriculum decisions have been made. It is also important to understand that the word "technology" ***is not synonymous with computers!*** Many educators use the word "technology" when they should say "computers".

Technology initiatives must be curriculum driven or educators all over America will have egg on their face surrounded by millions of dollars of worthless hardware. Technology is not just equipment, but instead a systematic process for designing effective learning experiences. The products of technology may be equipment, but the "**process of technology**" can lead educators to methods of solving many of the current problems that plague education. The simple but powerful concepts of ***defining*** educational problems, ***developing*** technologically-based solutions, and ***evaluating*** these over time (formative and summative) can be a forceful answer to implement and revise the current efforts to resolve the continuing crisis for education in public and higher education and within corporate settings.

Two recently-released videotape reports produced for the U.S. Congress Office of Technology Assessment may be reviewed to electronically visit public schools in America which are beginning to utilize the educational technologies, the equipment, materials and processes. The first deals directly with the new tools for teaching and learning, and the second with electronic distance education.[19] Both deal with the potential of beginning electronic learning innovations in education and the promise of new educational technology.

It has been said that it takes 19 years for an innovation to be accepted in education. We hope that is no longer a truth. A window is now open to test the link between teaching and technology,... it is a critical link and we believe technology, both as a ***process*** and ***product*** is at the core of a third-wave educational system. ***Educational Technology***, understood in this way, will likely become be the most important ***initiative for change*** to transpire in American Education.

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[1] Freedom And Equality Of Access To Information, A report to the American Library Association by the Commission on Freedom and Equality of Access to Information, Dan M. Lacy, Chair, Chicago, Ill.: ALA, 1986, frontice page.

[2] Computers in the Workplace: Selected Issues. Washington, D.C.: National Commission for Employment Policy, 1986, p. 19.

[3] Smellie, Don C. et. al. "Teaching and Technology: A Critical Link", Association for Educational Communications and Technology sponsored teleconference to 103 down-link sites in the U.S. and Canada, March 14, 1990. Dr. T. H. Bell was the major panel member for this AECT sponsored international teleconference.

[4] Bowsher, Jack E. Education America: Lessons Learned in the Nation's Corporations, New York: Wiley, 1989, p. 76-86.

[5] Galagan, Patricia A. "IBM Gets Its Arms Around Education," Training and Development Journal, January, 1989, p. 35.

[6] Heinich, Robert. "The Proper Study of Instructional Technology," Educational Communications and Technology Journal, Summer, 1984, p. 67-88.

[7] Ridley, William. "Interview," Tech Trends, February/March, 1985, p. 23.

[8] Galbraith, John Kenneth. The New Industrial State, New York: Houghton Mifflin, 1967, p. 12.

[9] Heinich, Robert; Molenda, Michael and Russell, James D. Instructional Media and the New Technologies of Instruction, New York: Macmillan, 3rd Edition, 1989, p. 444.

[10] Case, Charles W. and Matthes, William A., editors. Colleges of Education: Perspectives on Their Future, Berkeley, CA: McCutchan, 1985, 206 pp. and Rassekh, Shapour and Vaideanu, George, The Contents of Education: A Worldwide View of Their Development from the Present to the Year 2000, United Nations Educational, Scientific and Cultural Organization, Paris, France, 1987, 297 pp.

[11] To Improve Learning: A Report to the President and the Congress of the United States, by the Commission on Instructional Technology (House Committee on Education and Labor), Washington, D.C.: U.S. Government Printing Office, 1970, p. 5.

[12] Mecklenburger, James A. "Educational Technology Is Not Enough," Phi Delta Kappan, October, 1990, p. 106.

[13] Reigeluth, Charles M. "The Search for Meaningful Reform: A Third-Wave Educational System," Journal of Instructional Development, Vol. 10, No. 4, 1987, p.3-26.

[14] Toffler, Alvin. The Third Wave. New York: William Morrow, 1980.

[15] Goodlad, John I. A Place Called School: Prospects for the Future. New York: McGraw Hill, 1984.

[16] Lacy, Bill N. "The Pencil Revolution," Newsweek, March 19, 1984, p. 17.

[17] Salomon, Gavriel. "The Computer Lab: A Bad Idea Now Sanctified," Educational Technology, October, 1990, pp. 50-52.

[18] Educational Technology:NEA Special Committee Report, Washington D.C.: NEA, 1989, 21 pp. The report is available from NEA, 1201 Sixteenth Street, N.W., Washington, D.C. 20036.

[19] "Linking for Learning: A New Course for Education", is a 26 minute videotape released October 1, 1990, by S L Productions, Box 1243, Manhasset, New York, 11030, produced for the US Congress Office of Technology Assessment. The tape is available in VHS or BETA for $30. An earlier videotape also produced for the US Congress OTA, "Power On! New Tools for Teaching and Learning" with the "Promise of Educational Technology" is also available at the same cost from SL Productions. Both supplement printed studies about educational technology which were published by the U.S. Congress Office of Technology Assessment as U.S. Government Documents.

Appendix A

EDUCATIONAL TECHNOLOGY PROGRAMS

Part 7 of Title 53A

STATE SYSTEM OF PUBLIC EDUCATION

Utah Code Annotated

1990 Cumulative Supplement

EDUCATIONAL TECHNOLOGY: INITIATIVE FOR CHANGE

by

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©

February, 1990

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PART 7

EDUCATIONAL TECHNOLOGY PROGRAMS

53A-1-701. Legislative declaration and authorization.

(1) The Legislature recognizes that the quality of public education can be enhanced in the state by providing for educational technology programs that:

(a) support and encourage the use of educational technology in the state's public schools;

(b) train teachers and prospective teachers in the state's colleges of education to effectively use educational technology in the classroom;

(c) promote a strong technology partnership between public education and private enterprise;

(d) promote student performance in the basic curriculum areas of mathematics and reading and encourage achievement in other curriculum areas identified by each local school board;

(e) focus public and private funding on critical educational areas that directly support student achievement and economic development;

(f) support the development of educational technology in Utah and encourage the expansion of high technology industry in the state; and

(g) are available to each school district so that all students enrolled in the state's public elementary and secondary schools may have access to educational technology programs.

(2) School districts and colleges of education are authorized and encouraged to develop and establish educational technology programs in conjunction with the guidelines provided in this part.

53A-1-702. Appropriation — Allocations — Matches from school districts, the business community, and technology vendors.

(1) There is appropriated for FY 1989-90 $13,500,000 from the Uniform School Fund to the State Board of Education and $1,500,000 from the General Fund to the State Board of Regents to help implement the technology programs authorized in this part.

(2) The appropriation is allocated as follows:

(a) the State Board of Education shall receive $13,365,000 for allocation to the state's 40 school districts, distributed in two parts:

(i) the board shall distribute the first part, 25% of the appropriation, equally among the state's 40 school districts so that each district receives $83,531; and

(ii) the board shall distribute the second part, 75% of the appropriation, based on the ratio of a district's estimated average daily membership for the 1989-90 school year to the state total average daily membership for 1989-90;

History: C. 1953, 53A-1-601, enacted by L. 1990, ch. 235, § 1; recompiled as 53A-1-701.

Compiler's Notes. — Sections 53A-1-701 to 53A-1-706 were enacted as §§ 53A-1-601 to 53A-1-606, but have been renumbered as these sections by the Office of Legislative Research and General Counsel because of the enactment at the 1990 session of other sections numbered 53A-1-601 et seq.

Effective Dates. — Laws 1990, ch. 235 became effective on April 23, 1990, pursuant to Utah Const., Art. VI, Sec. 25.

(b) the State Board of Regents shall receive $1,485,000 for allocation to the state colleges of education based on each state college's student teacher training enrollment FTE's for 1989-90 as compared to the total student teacher training enrollment FTE's for all state colleges of education for 1989-90; and

(c) 1% of the total appropriation, $150,000, is allocated to the Technology Initiative Project Office established under this part for program administration and coordination costs.

(3) It is the intent of the Legislature that neither the State Board of Education nor the State Board of Regents may establish rules that restrict school districts or colleges of education in their purchases of educational technology under this part or use any of the money appropriated under this section for administrative or overhead costs, other than the allocation provided to the Technology Initiative Project Office under Subsection (2)(c). The monies shall flow through the respective state boards directly to the school districts and colleges, subject to any qualifications established under this part.

(4) It is the intent of the Legislature that the Legislature shall appropriate additional monies for the programs authorized under this part for fiscal years 1990-91, 1991-92, and 1992-93. The additional appropriations are contingent upon matching contributions from federal and business sources and school districts.

(5) School districts and colleges shall match state appropriations for the technology programs on a one to three basis, that is one dollar in local resources for every three state dollars, either through local funding efforts or through in-kind services, which may include providing an infrastructure, planning services, training services, maintenance, or the use of technical assistance specialists.

(6) (a) The Utah Partnership for Educational and Economic Development shall participate in the program in the following manner:

(i) the partnership shall assist in the solicitation of additional resources for the technology programs authorized under this part from private business and federal sources, with the intent to match the state appropriations from this and other sources on a two to three basis, that is resources having a value of two dollars for every three state dollars;

(ii) the resources raised through the efforts of the partnership shall flow through the State Office of Education and the Office of the Commissioner of Higher Education for allocation to:

(A) the school districts on the basis of a district's average daily membership as compared to the state system's average daily membership; and

(B) state colleges of education on the basis of student teacher training enrollment FTE's;

(iii) the partnership shall establish an Educational Technology Committee comprised of educational technology vendors and others, who desire to participate in the technology program authorized under this part, to provide advisory technical support to the committee and project office.

(b) Monies raised by a school district or college from the private sector for educational technology purposes qualify for the two to three match under Subsection (6)(a)(i) up to the percentage of the allocation a district or college would receive under Subsection (6)(a)(ii).

(7) Vendors who participate in the technology program shall make contributions to the program in terms of vendor discounts, inservice training, and continuing support services under standards established by the Technology Initiative Steering Committee.

53A-1-703. Technology Initiative Steering Committee — Composition — Compensation.

(1) There is established a Technology Initiative Steering Committee, hereafter referred to as the committee, consisting of 13 members selected or appointed as follows:

(a) three business members of the Utah Partnership for Educational and Economic Development selected by the partnership;

(b) one member appointed by the governor, representing the executive branch;

(c) the state chief procurement officer or his designee;

(d) the state superintendent of public instruction or his designee;

(e) a school district superintendent, appointed by the Utah School Superintendents Association;

(f) a local school board member, appointed by the Utah School Boards Association, except that the board member and district superintendent may not be from the same school district;

(g) two public school classroom teachers who have experience and expertise in the use of educational technology, one selected by the other members of the committee and one selected by the state's largest teacher association;

(h) the commissioner of higher education or his designee; and

(i) two members who have experience and expertise in the use of educational technology, one appointed by the speaker of the House of Representatives and one by the president of the Senate.

(2) The committee shall appoint one of the three business members from the partnership to serve as chairman.

(3) Members of the committee shall serve without compensation.

(4) A majority of the committee is a quorum for the purpose of conducting business. Members are appointed or selected for four-year terms.

(5) Members of the committee may not benefit financially, either directly or indirectly, or receive payments for goods or services, or be affiliated with any vendor that may benefit financially from this act.

53A-1-704. Duties and responsibilities.

(1) The committee has the following duties and responsibilities:

(a) to establish a Technology Initiative Project Office, which shall cease to exist on June 30, 1993, unless reauthorized by the Legislature;

(b) to appoint a director for the project office who is not affiliated with any technology vendors;

(c) to review and approve school district and college of education plans and reports related to the technology programs authorized and funded under this part, incorporating broad, objective, functional requirements and guidelines within the approval process;

(d) to review and provide criteria on an ongoing basis for technology products to be used in the programs, which criteria shall give consideration to at least any one or all of the following:

(i) technology that emphasizes instruction;

(ii) technology discounts, which may include installation and maintenance of a technology product;

(iii) a sound inservice component for educators;

(iv) upgrading of options in the original technology, at the same discount rate as given in the original purchase or lower for at least five years after the purchase of the original technology;

(v) technology of proven worth;

(vi) available technology evaluations;

(vii) submission of technology for evaluation by a committee of instructional software users;

(viii) cost effectiveness of the technology being offered;

(ix) identification of discontinued technology;

(x) compatibility of the technology with other technology products, using industry-wide standards; and

(xi) identification of the closest multiple sites and contact persons where the technology is being used and can be observed;

(e) to coordinate raising of funds from federal and private sources to supplement the appropriation authorized under this part for technology programs in the public schools and colleges of education;

(f) to verify that an appropriate evaluation of each plan is included in the plan itself; and

(g) to receive advisory input from the Educational Technology Committee established by the Utah Partnership for Educational and Economic Development.

(2) The project office has the following duties:

(a) to assist the committee in fulfilling its duties set out in Subsections (1)(c), (d), (e), and (f) as directed by the committee; and

(b) to establish a technical review committee in the project office, consisting of volunteers who have educational technology expertise and are not affiliated with any vendors participating in the technology programs.

53A-1-705. Educational technology plans — Components — Review and approval — Reports.

(1) Each school district shall prepare and submit a plan to the committee for review and approval of the district's proposed use of its technology allocation. The approval is of the plan and not of specific products or technology.

(2) The plan shall include the following components:

(a) the technology purchases to be made and proposed installation, maintenance, and replacement costs;

(b) specific, focused educational goals and measurable academic objectives to be accomplished in the district with the program, giving consideration to the respective size and needs of both student and teacher populations;

(c) valid instructional strategies, including inservice training for teachers;

(d) procedures to optimize the cooperation of all levels of education in the program, particularly in the planning process, including principals and teachers;

(e) methods to evaluate the program; and

(f) details of how the new technology will integrate with existing technology in the district.

(3) Each college of education shall prepare and submit a plan to the committee for review and approval of the proposed use of its appropriation. The plan shall focus on training teachers and prospective teachers to use the technology which school districts may acquire under this part.

(4) A school district or college of education may not spend any of the monies appropriated under this part until the plans for its technology program have been reviewed and approved by the committee.

(5) (a) Each school district and college of education shall prepare and submit a report to the committee on the actual use of its allocation under this part.

(b) The reports shall include information on how the technology is being used to reach the performance goals established under Subsections (2)(b) and (4) and the progress on attaining the goals.

(c) The district or college of education shall submit the report by December 31, 1990, and send a copy of the report to the governor and the Legislature.

(d) The districts and colleges shall submit additional annual reports for each year the Legislature provides appropriations for the technology programs.

(e) The committee shall make regular reports to the Education Interim Committee of the Legislature on the status of the programs authorized under this part.

53A-1-706. Purchases of educational technology.

(1) A school district or college of education shall comply with Chapter 56, Title 63, the Utah Procurement Code, in purchasing technology under this part.

(2) A school district or college of education may purchase technology through cooperative purchasing contracts administered by the state Division of Purchasing or through its own established purchasing program.

This act was introduced by Representative Richard Bradford on February 15, 1990, as Utah House of Representatives Bill 468, *Educational Technology in Public and Higher Education.* The effective date of the act was April 23, 1990, pursuant to the *Utah Constitution*, Article VI, Section 25. The act is published in the *Utah Code* as Part 7, Section 53A, 1990 Supplement, and is titled *Educational Technology Programs.*